

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

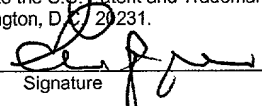
In re Application of:
Richard E. Smalley et al.

For: CARBON FIBERS FORMED FROM
SINGLE-WALL CARBON
NANOTUBES

Atty Dkt: 11321-P012USD3

§ Serial No: To Be Assigned
§ (division of application
§ Serial No. 09/380,545)
§
§ Filed: CONCURRENTLY HEREWITH
§
§ Group Art Unit: 1754 (anticipated)
§
§ Prior Examiner: Stuart Henderson
§ 703.308.2539
§

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	Gracie Segovia Printed Name

**PRELIMINARY AMENDMENT ACCOMPANYING REQUEST FOR FILING
DIVISIONAL APPLICATION UNDER 37 C.F.R. § 1.53(b)**

Sir:

This paper accompanies a Request for Filing Divisional Application Under 37 C.F.R. § 1.53(b) and associated filing fee therefor ("the Request"). If the fee payment is missing or insufficient in amount, or if any other fees are determined to be due, the Assistant Commissioner, Commissioner, and/or the Director of the U.S. Patent & Trademark Office is/are hereby authorized to charge any such fees (or credit any overpayment) to Winstead Sechrest & Minick Deposit Account No. 23-2426, referencing matter number 11321-P012USD3.

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AMENDMENTS

In the Title

Please amend the title by replacing the present title with the following:

--METHOD FOR FORMING AN ARRAY OF SINGLE-WALL CARBON NANOTUBES
AND COMPOSITIONS THEREOF--

In the Abstract

Please amend the abstract by replacing the present abstract with the following:

--This invention relates generally to forming an array of single-wall carbon nanotubes (SWNT) and compositions thereof. In one embodiment, a homogeneous population of SWNT molecules is used to produce a substantially two-dimensional array made up of single-walled nanotubes aggregated in substantially parallel orientation to form a monolayer extending in directions substantially perpendicular to the orientation of the individual nanotubes. Using SWNT molecules of the same type and structure provides a homogeneous array. By using different SWNT molecules, either a random or ordered heterogeneous structure can be produced by employing successive reactions after removal of previously masked areas of a substrate. In one embodiment, SWNT molecules may be linked to a substrate through a linker moiety such as -S-, -S-(CH₂)_n-, -NH-, -SiO₃(CH₂)₃NH- or the like.--

In the Specification

Please amend the specification as noted on page 5, paragraph 11 of the Request by inserting before the first line of the specification the following:

--RELATED APPLICATIONS

This application is a division of co-pending prior U.S. patent application Serial No. 09/380,545, filed on September 3, 1999, entitled "CARBON FIBERS FORMED FROM

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SINGLE-WALL CARBON NANOTUBES,” which is the 35 U.S.C. § 371 national application of International Application Number PCT/US98/04513 filed on March 6, 1998, which designated the United States, claiming priority to: provisional U.S. patent application Serial Number 60/067,325, filed on December 5, 1997; provisional U.S. patent application Serial Number 60/064,531, filed on November 5, 1997; provisional U.S. patent application Serial Number 60/063,675, filed on October 29, 1997; provisional U.S. patent application Serial Number 60/055,037, filed on August 8, 1997; provisional U.S. patent application Serial Number 60/047,854, filed on May 29, 1997; and provisional U.S. patent application Serial Number 60/040,152, filed on March 7, 1997. Each of the foregoing applications is commonly assigned to the assignee of the present invention and is hereby incorporated herein by reference in its entirety.

This application discloses subject matter related to the subject matter of U.S. patent application Serial Number 10/000,746, filed on November 30, 2001 in the name of Daniel T. Colbert et al., entitled “MACROSCOPICALLY MANIPULABLE NANOSCALE DEVICES MADE FROM NANOTUBE ASSEMBLIES,” which application is commonly assigned to the assignee of the present invention.--

In the Claims

Please amend the claims as follows:

A. Please cancel claims 1-30 and 34-162 without prejudice or disclaimer to the subject matter thereof.

B. Please amend claim 33 as follows:

33. (Amended) The method of claim 32 wherein said linking moiety is selected from the group consisting of -S-, -S-(CH₂)_n -NH-, and -SiO₃(CH₂)₃NH- [SiO₃(CH₂)₃NH₃].

C. Please add the following new claims 163-188:

163. (New) A method for forming a large array comprising:

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- (a) providing a plurality of arrays, wherein each of the arrays of the plurality comprise single-wall carbon nanotubes; and
- (b) assembling the plurality of arrays to form a large array.

164. (New) An array comprising a plurality of single-wall carbon nanotubes aggregated in substantially parallel orientation, wherein the plurality comprises at least 10^3 of the single-wall carbon nanotubes.

165. (New) The array of claim 164 wherein the plurality comprises at least 10^{10} of the single-wall carbon nanotubes.

166. (New) A membrane comprising an array of single-wall carbon nanotubes in a substantially parallel relationship, wherein the membrane is nanoporous.

167. (New) The membrane of claim 166 wherein the membrane is conductive.

168. (New) The membrane of claim 166 further comprising at least one photoactive molecule attached to the membrane.

169. (New) The membrane of claim 166 wherein at least one of the single-wall carbon nanotubes have ends that are derivatized with a photoactive dye molecule.

170. (New) A fullerene intercalation compound comprising:

- (a) an array of single-wall carbon nanotubes; and
- (b) a chemical species, wherein the chemical species are intercalated into space selected from the group consisting of in the tubes, between the tubes, and combinations thereof.

171. (New) A fullerene intercalation compound of claim 170 wherein the chemical species comprises lithium ions.

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172. (New) A membrane comprising carbon fibers that are aggregates of a plurality of single-wall carbon nanotubes, wherein the plurality of single-wall carbon nanotubes are in a generally parallel orientation.
173. (New) The membrane of claim 172 further comprising at least one dopant physically entrapped between the single-wall carbon nanotubes of the carbon fibers.
174. (New) The membrane of claim 173 wherein the dopant comprises a substance selected from the group consisting of metals, halogens, FeCl_3 , and combinations thereof.
175. (New) A photocell comprising a membrane, wherein the membrane comprises an array of single-wall carbon nanotubes in a substantially parallel relationship.
176. (New) The photocell of claim 175 wherein the membrane further comprises at least one photoactive molecule attached to the membrane.
177. (New) A battery comprising a membrane, wherein the membrane comprises an array of single-wall carbon nanotubes in a substantially parallel relationship.
178. (New) The battery of claim 177 wherein the battery is a lithium ion battery.
179. (New) A battery comprising a membrane, wherein the membrane comprises carbon fibers that are aggregates of single-wall carbon nanotubes, and wherein the plurality of single-wall carbon nanotubes are in a generally parallel orientation.
180. (New) The battery of claim 179 wherein the battery is a lithium ion battery.
181. (New) A lithium ion battery comprising an anode, wherein the anode comprises at least 10^3 single-wall carbon nanotubes bound to a substrate.
182. (New) A lithium ion battery comprising an anode, wherein the anode comprises ends of carbon fibers that are aggregates of single-wall carbon nanotubes in generally parallel orientation.

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183. (New) A lithium ion battery comprising a fullerene intercalation compound.
184. (New) A device comprising an electrode in contact with an electrolyte, wherein the electrode comprises single-wall carbon nanotubes having open ends, and wherein the open ends are chemically derivatized.
185. (New) The device of claim 184 wherein the device is a lithium ion battery.
186. (New) The device of claim 184 wherein the open-ends are chemically derivatized with a moiety providing an interface capable of supporting a reduction-oxidation reaction.
187. (New) The device of claim 184 wherein the open-ends are chemically derivatized with a moiety selected from the group consisting of polyethylene oxide, polyethylene oxide oligomers and combinations thereof.
188. (New) A fuel cell comprising a membrane, wherein the membrane comprises carbon fibers that are aggregates of a plurality of single-wall carbon nanotubes, and wherein the plurality of single-wall carbon nanotubes are in a generally parallel orientation.

REMARKS

A. *Status of the Application.* On September 3, 1999, Applicant filed the parent patent application, U.S. patent application Serial No. 09/380,545, which included originally filed claims 1-162. In an Office Action, dated June 20, 2000, ("the Office Action") the Examiner subjected the claims to a restriction requirement. According to the Office Action, the parent patent application's claims were directed to eleven (11) distinct inventions. Applicant elected the invention of Group VIII in the parent patent application. The present divisional application is directed to the invention of Group III, which were identified as the invention claimed by originally filed claims 31-33.

Accordingly, originally filed claims 31-33 remain in the application, and the other originally filed claims -- claims 1-30 and 34-162 -- are cancelled herein without prejudice or

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disclaimer to the subject matter thereof. Additionally, claims 163-188 have also been added herein. No new matter is added by the addition of these claims.

B. *Amended Claim.* Claim 33 is amended herein. The Applicant respectfully asserts that the amendment to claim 33, and incorporated by reference in any claims depending therefrom, are not narrowing amendments made for a reason related to the statutory requirements for a patent that will give rise to prosecution history estoppel. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 555, 566, 56 U.S.P.Q.2d 1865, 1870 (Fed. Cir. 2001).

Attached hereto is a marked-up version of the changes made to claim 33 by the current amendment. The attached page is captioned **“Version with Markings to Show Changes Made.”**

CONCLUSION

It is believed that each of the claims now pending in the present application recites elements neither taught nor suggested by the prior art. Further, it is believed that the application as a whole is in proper form and condition for allowance. If the Examiner believes that the application may be placed in even better condition for allowance, he or she is invited to contact the undersigned at the telephone number noted below. Alternatively, or in addition, if the Examiner believes that an Examiner interview would be beneficial, the Examiner is invited to note that the undersigned has ready access to the videoconferencing facilities of the South Central Intellectual Property Partnership at Rice University in Houston, Texas. The inventors and the undersigned would welcome the opportunity to use those facilities to clarify any issues deemed to remain unresolved.

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Respectfully submitted,



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